

Preparation of porous TiO₂ photocatalyst for Rhodamine B degradation

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Titanium dioxide (TiO₂) is a typical photocatalyst, due to its low cost, low toxic and good stability. When TiO₂ is combined with UV light rays, photocatalytic oxidation (PCO) occurs. Reactive electrons from TiO₂ tend to oxidize neighboring elements such as volatile organic compounds (VOCs), bacteria, etc. To enhance photocatalytic performance by providing more reaction sites, various porous structures have been developed. Also, the porous structure helps to prevent a recombination hole–electron pairs. In addition, strong light harvesting by light scattering can be expected as a pore size was controlled in similar size of light wavelength.

The porous TiO₂ was synthesized with TTIP and degusa (P25) as precursors by using Polystyrene (PS) soft template to make a porous structure. The pore size and number of TiO₂ photocatalyst was controlled by controlling PS beads size and a ratio of TiO₂ to PS, respectively. The crystal structure and photocatalytic activity of synthesized porous TiO₂ were evaluated by X-Ray Diffraction (XRD), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) and RhB decomposition.